



ROCC



Communications/Reporting

Reconnaissance and Surveillance Leader



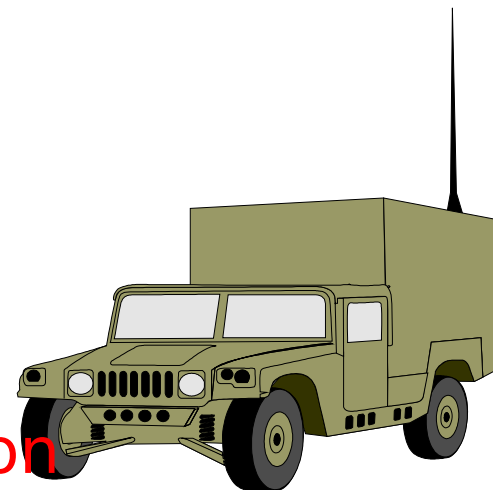
Agenda

- Base Radio Station Concept
- Message Traffic
- LRS Communications Systems
- Digital Capabilities
- Communications Limitations/Constraints



BRS Concept

- What is a LRS Base Radio Station?
 - Portable communications platform
 - Commander's link to deployed teams
- What makes up a BRS?
 - Two identical communications shelters
 - Redundancy
 - Tracking several teams at once
- Who operates and maintains it?
 - LRS Communications Platoon/Section





BRS Concept

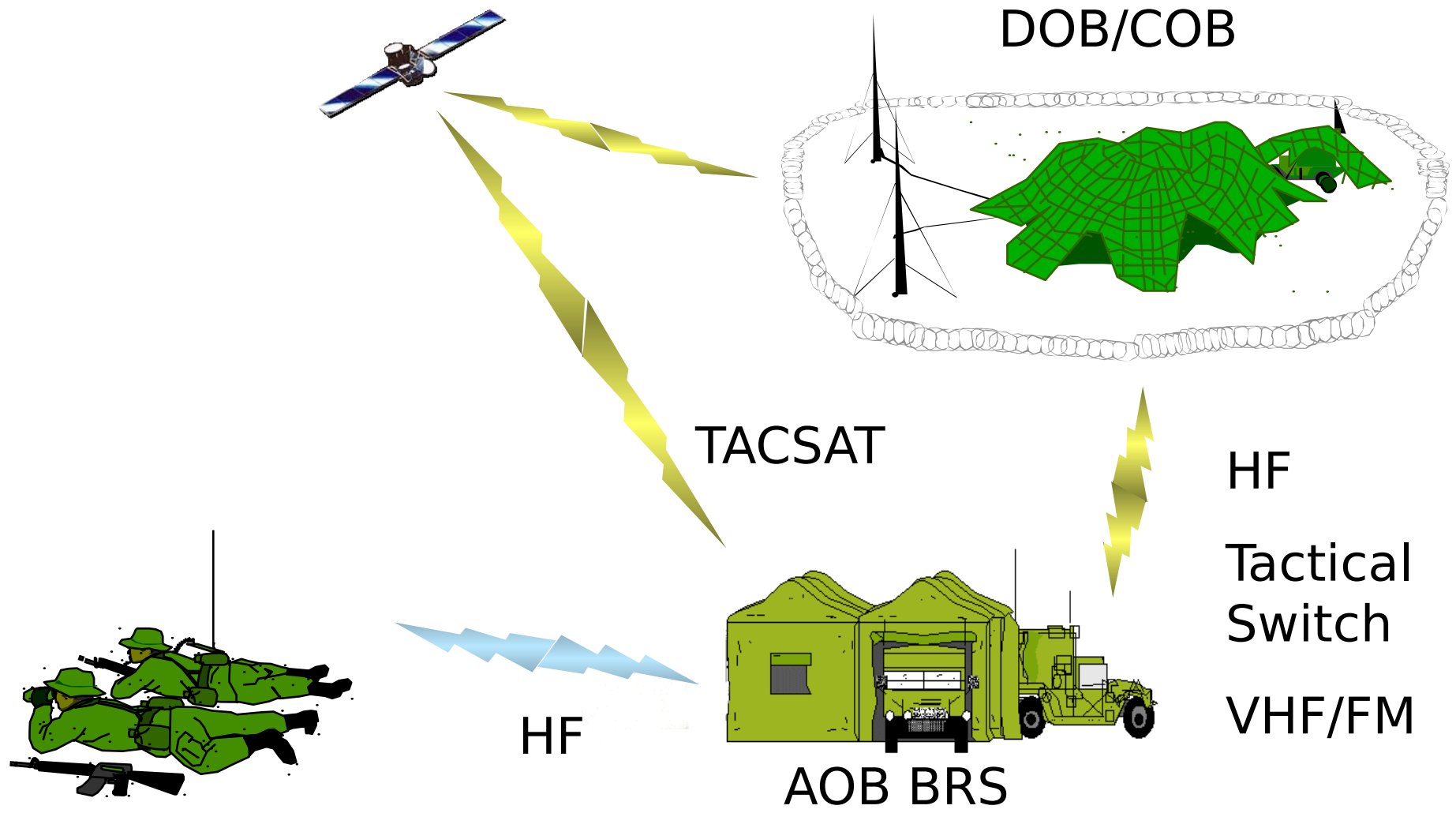
- DOB/BRS Operations is *the most* critical cell within the LRS communications network
- Primary link between the Commander and his deployed teams
- Normally located well within the security umbrella of the Corps or Division Main
- Close enough to the G2 to run a direct link LAN cable or wire line for reporting
- AOB may be collocated if communications has been established with teams
- AOB is always prepared to relocate in order to establish communications or when the COB/DOB

—relocates—

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AOB BRS Concept



LRS Team

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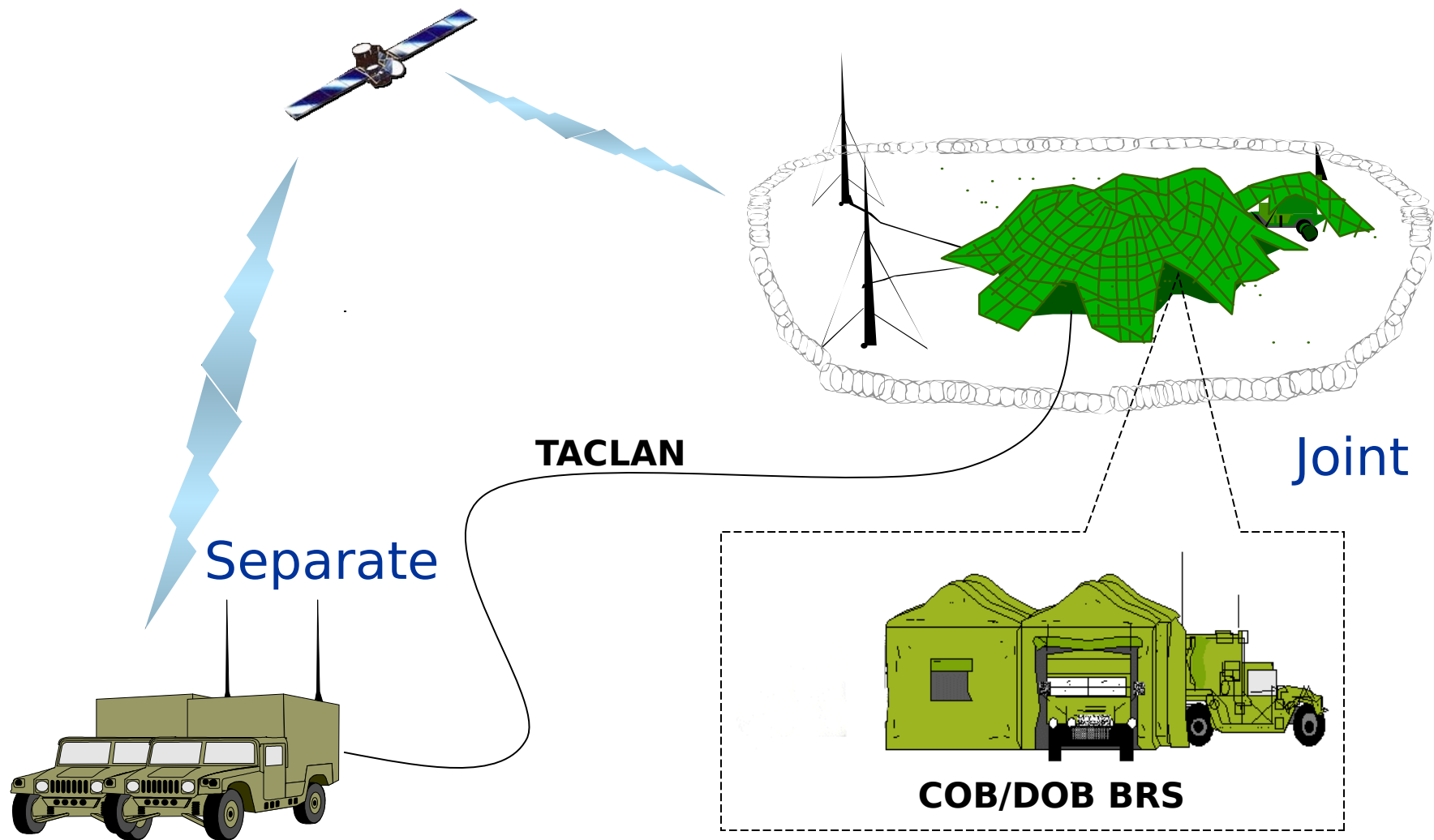


BRS Concept

- Two methods of employing the BRS, **Joint** and **Separate**
 - **Joint:** Attached to the DOB/COB tent, allows face-to-face contact between radio operator and ops cell
 - **Separate:** Detached from the DOB/COB, linked by TACLAN, TACSAT, wire or VHF FM

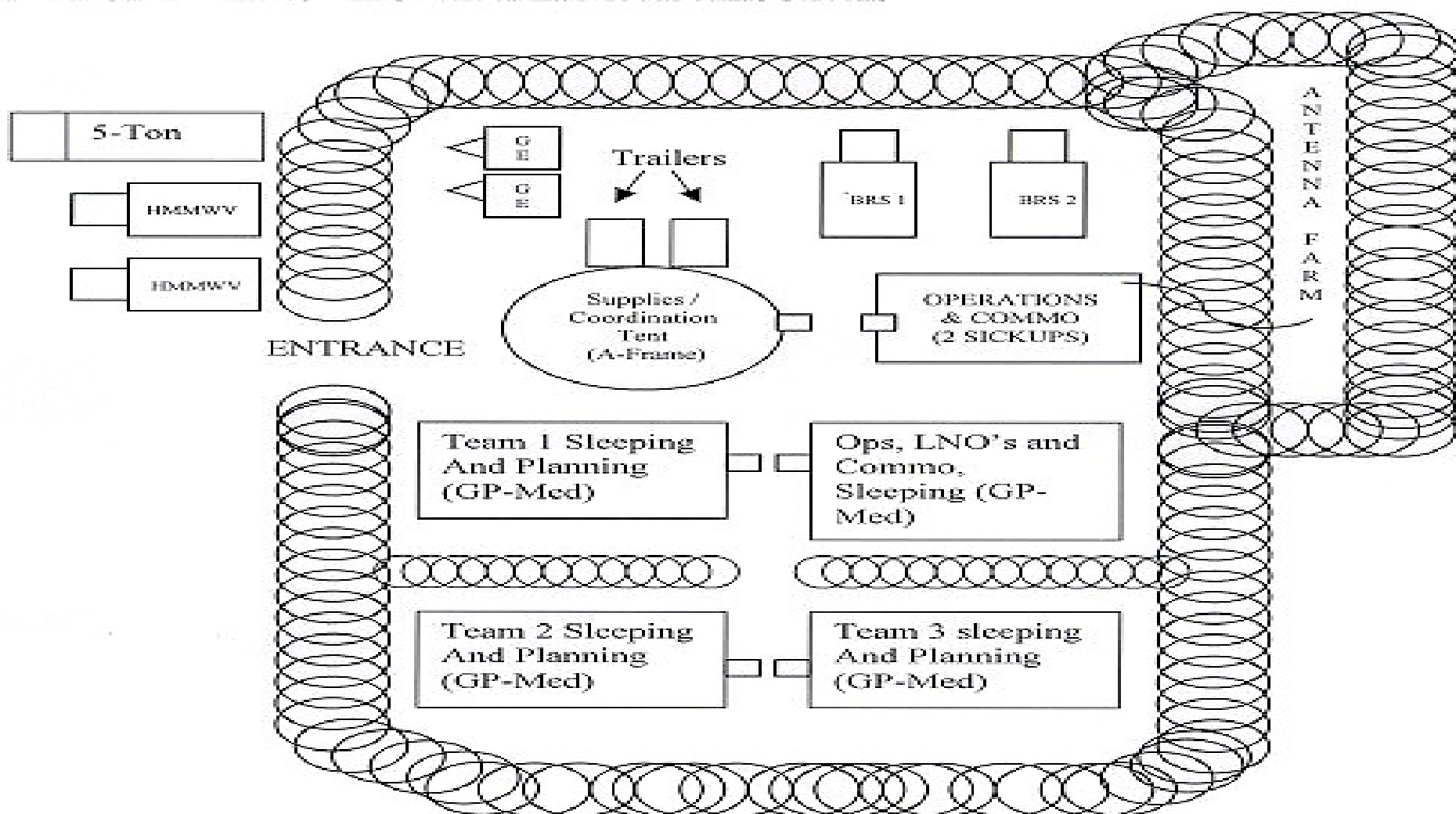


BRS Concept





BRS Concept



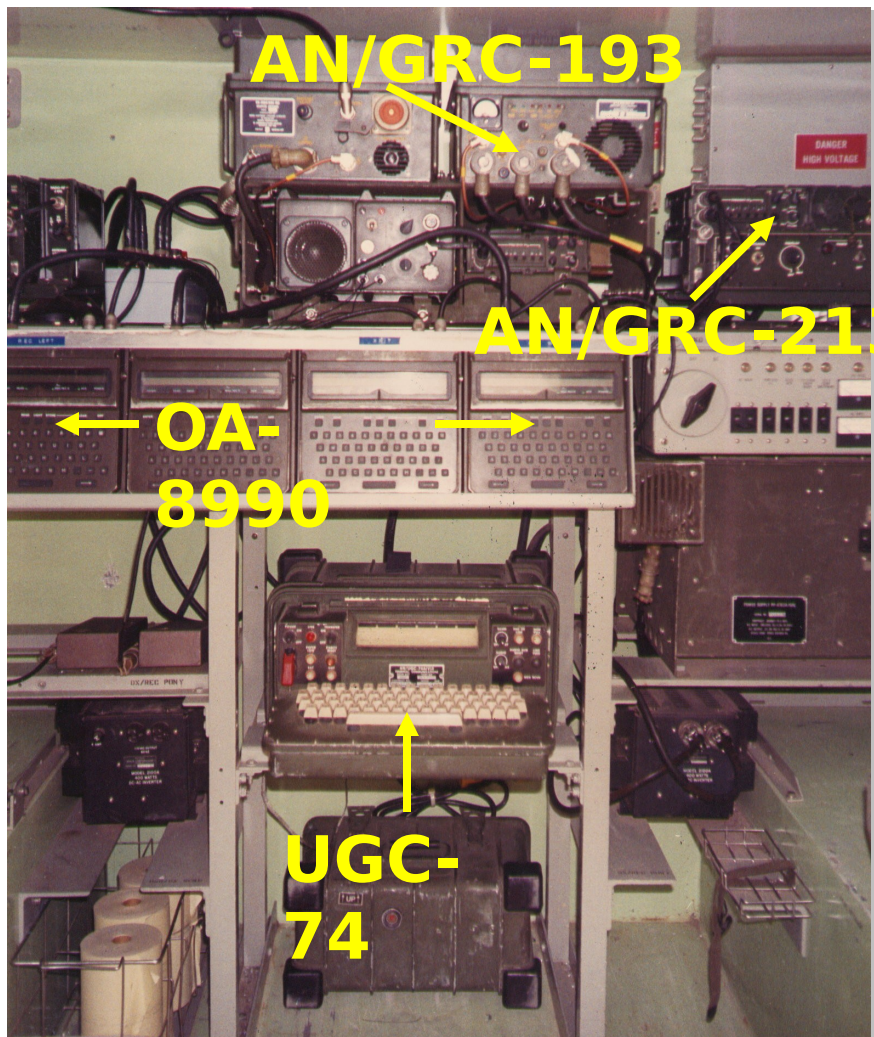


Base Radio Station (BRS)

“Legacy Equipment” →



AN/TSC-128

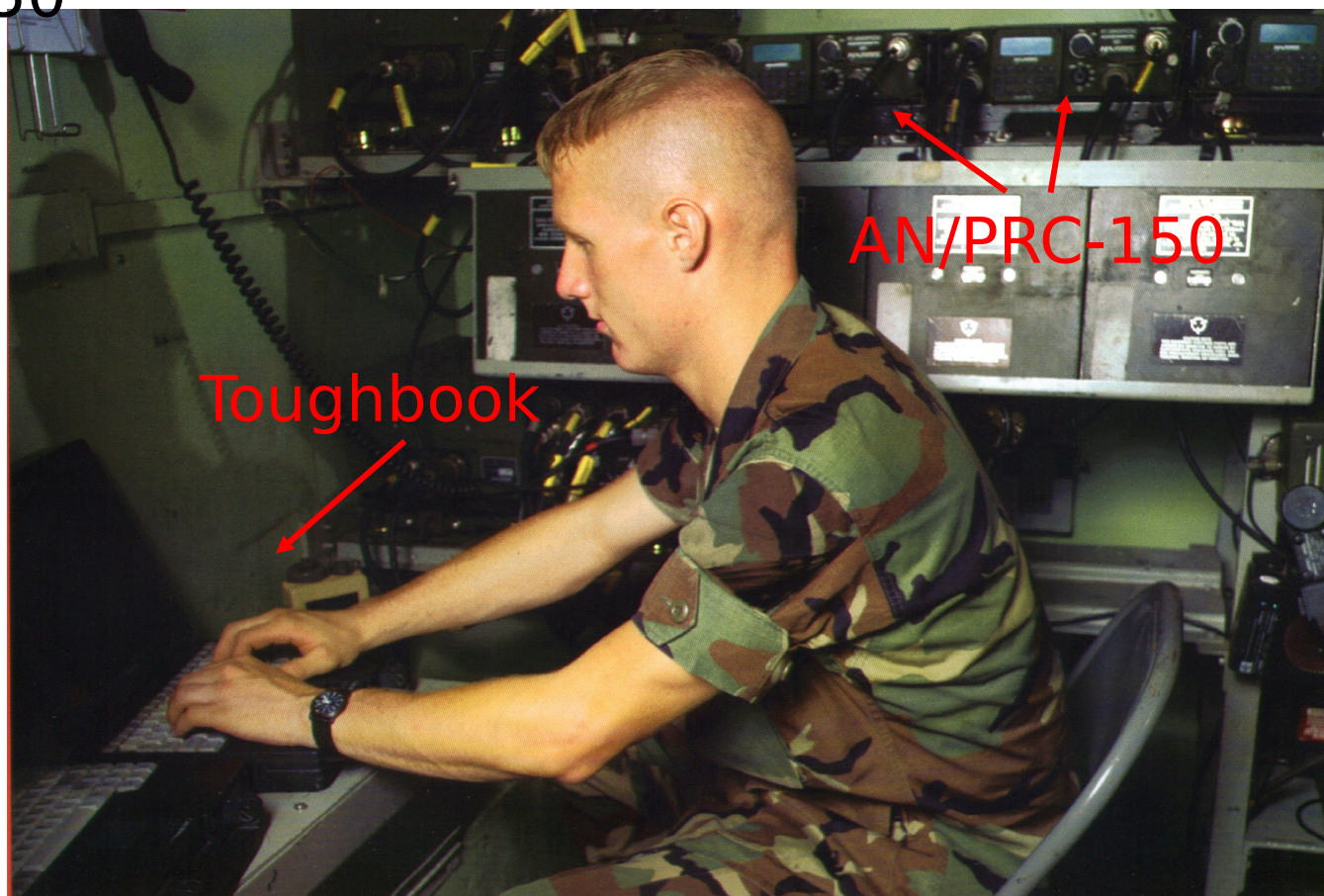


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Base Radio Station (BRS)

Legacy IHFR equipment replaced with AN/PRC-150



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Message Traffic

- Sending information is the primary mission of any LRS team
- Short, concise, accurate messages are the key
- Structured Message Formats are used by LRSU's to communicate information
- Every LRS Unit has an SOP covering the exact format of all reports

```
10DE11 MSG02 BORIS GHOST AAA 10 SOLDIERS, 3 VECH, 1 TRAILER, 1 ARTY BBB  
MOVING W THRU NAI 3 35 MPH ARTY CENTER CCC GL12345678 DDD UNK/ARTY EEE  
250800FEB03 FFF 3 BDRM2, 1 D30, 4 AK47, 4 US LBE, DCU'S, 4 HELMETS GGG  
TRAILER HALF FULL W/AMMO BOXES, HELMETS HAVE BLUE CENTER FRONT ACK EOM  
RKB
```



Message Traffic

- Messages include (but not limited to):

Initial Entry Report

“ANGUS”

Spot Intelligence Report

“BORIS”

Situation Report

“CYRIL”

Cache Report

“UNDER”

BDA Report

“CRACK”

Administrative Report

“CLEAR
”



CACHE Report Example

“UNDER”

AAA- TYPE OF CACHE (CONCEALMENT, BURIAL, SUBMERSION)

BBB- CONTENTS (ID TYPE & AMOUNT OF ITEMS IN CACHE)

CCC- NUMBER OF CONTAINERS

DDD-INITIAL REFERENCE POINT

EEE-LOCATION (AZIMUTH & DISTANCE FROM REFERENCE POINT WITH DETAILED DESCRIPTION IF NECESSARY)

FFF-DEPTH CACHE IS PLACED

GGG-ANY ADDITIONAL INFORMATION



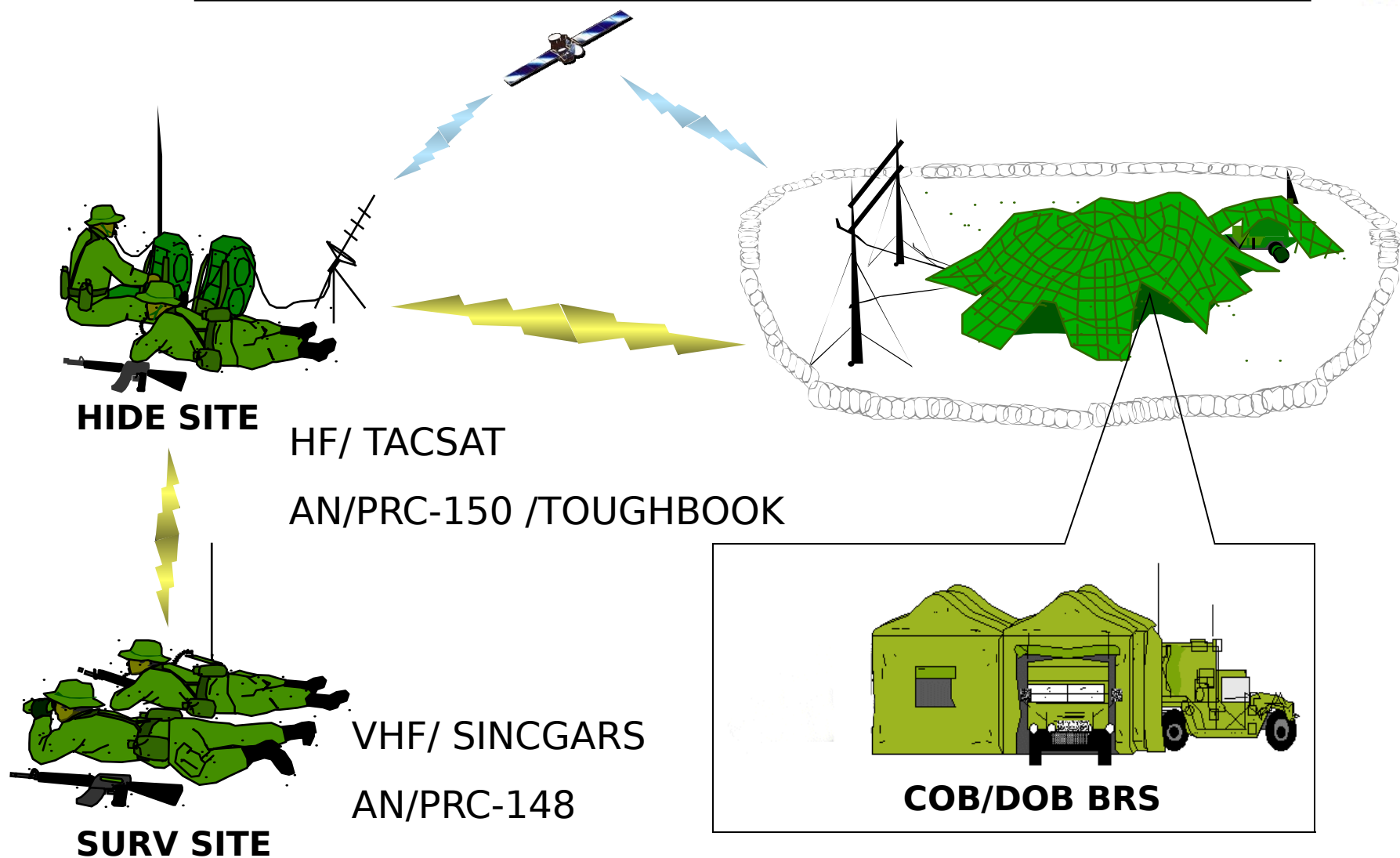
Example Format (BDA)

ADDRESS	MSG NUMBER	PROWORD	DURESS	MSG BODY
10DE11	MSG05	CRACK	GHOST	AAA 071200FEB03 BBB
GL123456	CCC 1	T-72	DESTROYED (CATASTROPHIC)	1
BTR-60	DAMAGED (MOBILITY KILL)	15 TROOPS KILLED		
DDD CONFIRMED	EEE. ENEMY WITHDRAWING,	TEAM		
MOVING TO EXTRACTION POINT	ACK	EOM	RKB	

ACKNOWLEDGMENT REQUESTED END OF MSG CODENAME

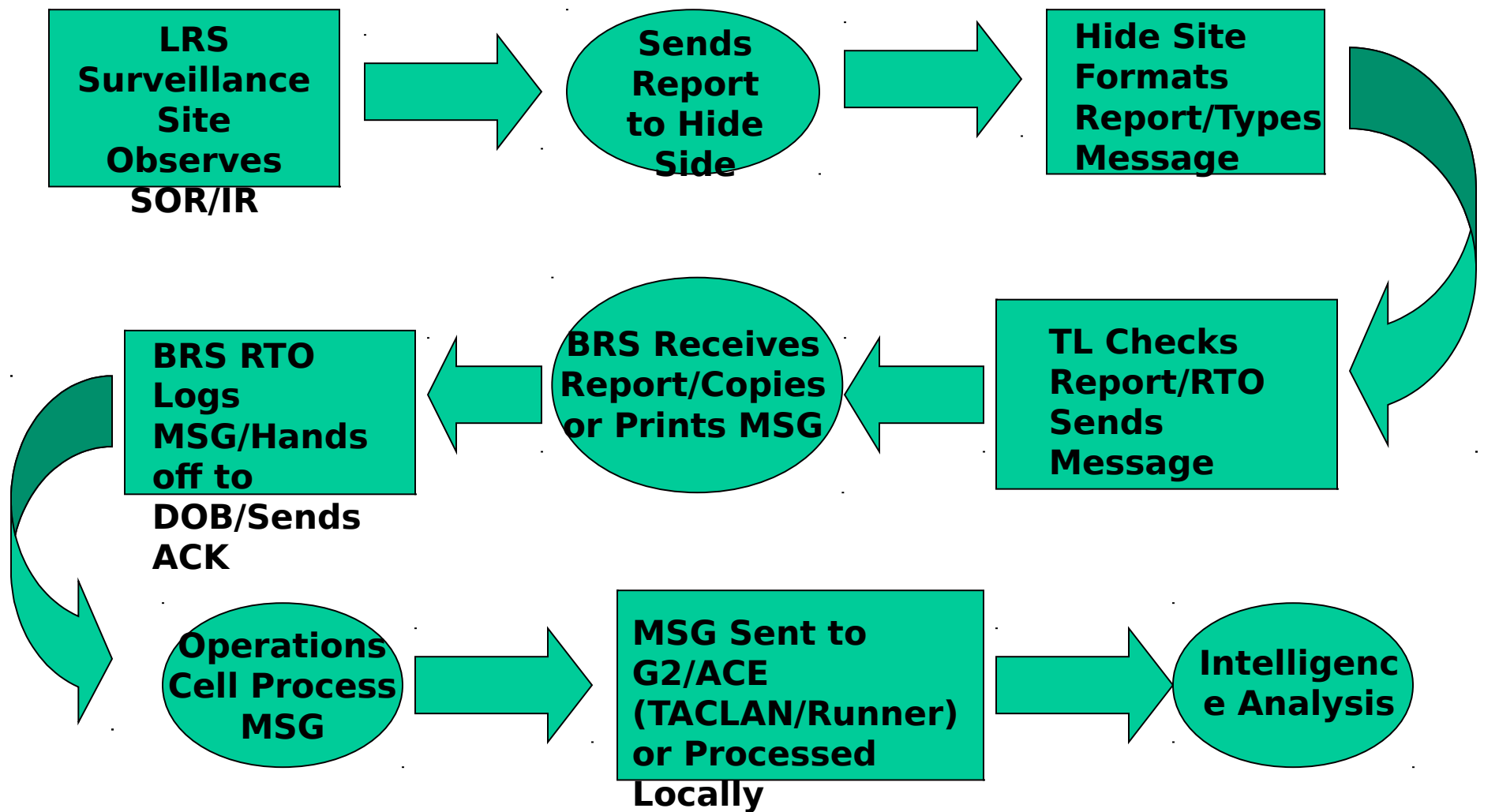


LRS Message Flow



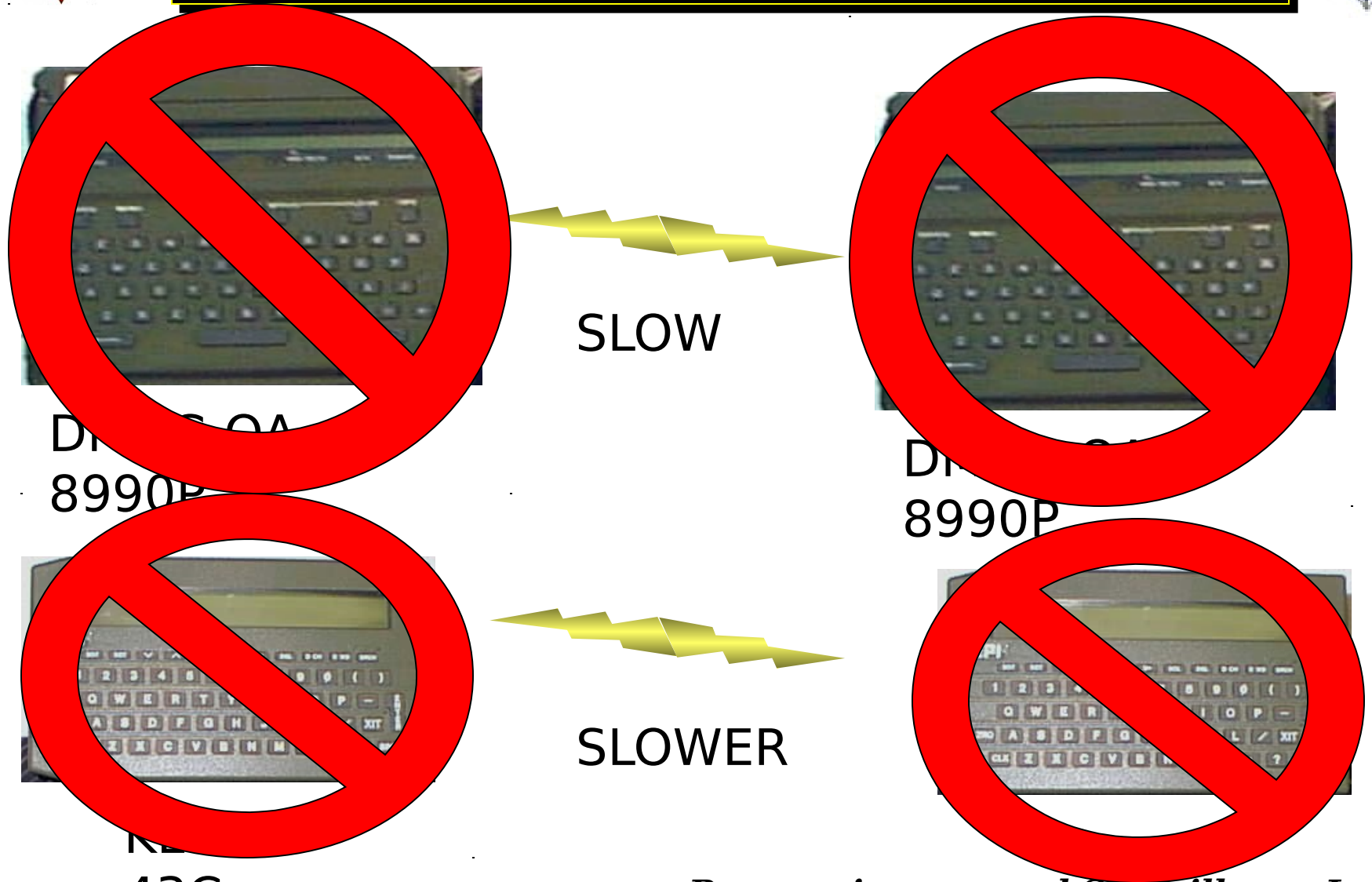


Message Traffic





Messaging Devices



DI 8990P

DI 8990P

43C

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43C



Tactical Chat

Tactical Chat

My Station

Open

Save

Print

About

Help

Talking To:

all

Delete Station

10DE11 MSG02 BORIS GHOST AAA 10 SOLDIERS, 3 VECH, 1 TRAILER, 1 ARTY BBB MOVING W THRU NAI 3 35 MPH ARTY CENTER CCC GL12345678 DDD UNK/ARTY EEE 250800FEB03 FFF 3 BDRM2, 1 D30, 4 AK47, 4 US LBE, DCU'S, 4 HELMETS GGG TRAILER HALF FULL W/AMMO BOXES, HELMETS HAVE BLUE CENTER FRONT ACK EOM RKB

No Radio Communications

☒ Auto Save

Save To Location:

C:\Program Files\Har

Save As...

Connections

Harris Radio Conn

Change View

Classic

Set Self Address

☒ Show Time

☒ Ctrl-Enter For Send

☐ Launch At Startup

☒ Sound Alert

Send

Note

Send File



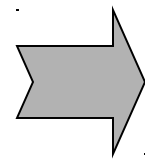
Tactical Chat



AN/PRC-150(C)



Sent over 3G HF
With TAC CHAT
Message and Photo
Attached

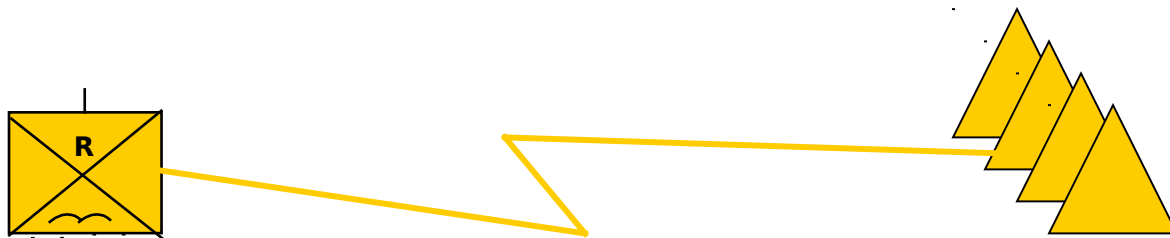


ToughBook CF-



Communications

- LRS teams deploy farther than line-of-sight (LOS) communication range
- Ordinary CNR systems cannot support the reporting requirements of the LRSU. Tactical FM radios, such as SINCGARS, must be in sight of each other electronically to communicate





Communications

Two Tactical Beyond Line-Of-Sight (BLOS) Systems Are:

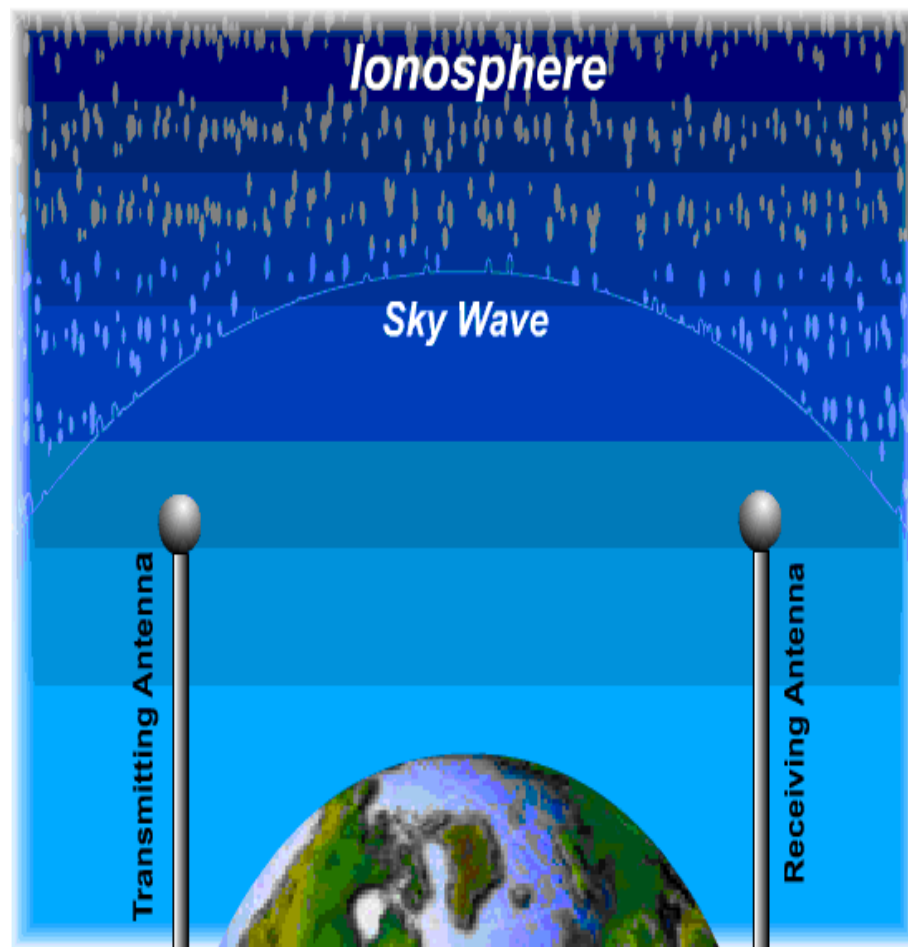
- **Modern High-frequency (HF) Systems**
- **Tactical Satellite (TACSAT) Radios.**





HF Communications

- HF achieves long range communications without the use of satellite relays
- HF radios use the Ionosphere to relay signals
- HF communications can be secure voice or data or both
- New technology and advanced waveforms





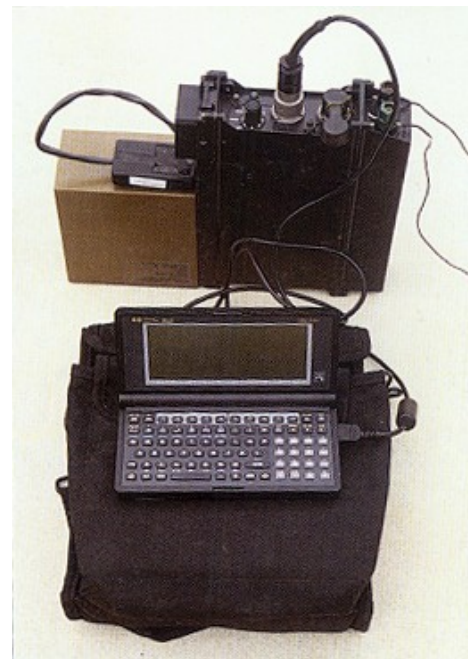
HF Communications

- The two HF radio systems being used in LRS Units are:

AN/PRC-150(C)

AN/PRC-137

- V Corps LRSC is the only LRS Unit currently using the AN/PRC-137





AN/PRC-150

- Frequency Range From 1.6 To 60 Mhz In SSB And FM Modes
- Ability to interface with the Army's SINCGARS radios
- Multi-waveform High Speed Data Rates (Up To 9600 Bps)
- Digital Voice Capablility
- **Automatic Link Establishment**
- Easy Interface With Data And Imaging Devices (Digital Cameras, Laptop Computers)
- Frequency Hopping
- Menu-driven Interface
- Advanced Comsec Features





AN/PRC-137

- Primarily used by Special Operations (SF ODA)
- Frequency Range 1.6 To 60 Mhz
- 10 Watt Power Output
- ALE Capable
- Embedded Modems
- Must Be Interfaced With A Data Messaging Device To Operate/Program
- Uses Only One Battery
- Smaller And Lighter Than The AN/PRC-150





ALE

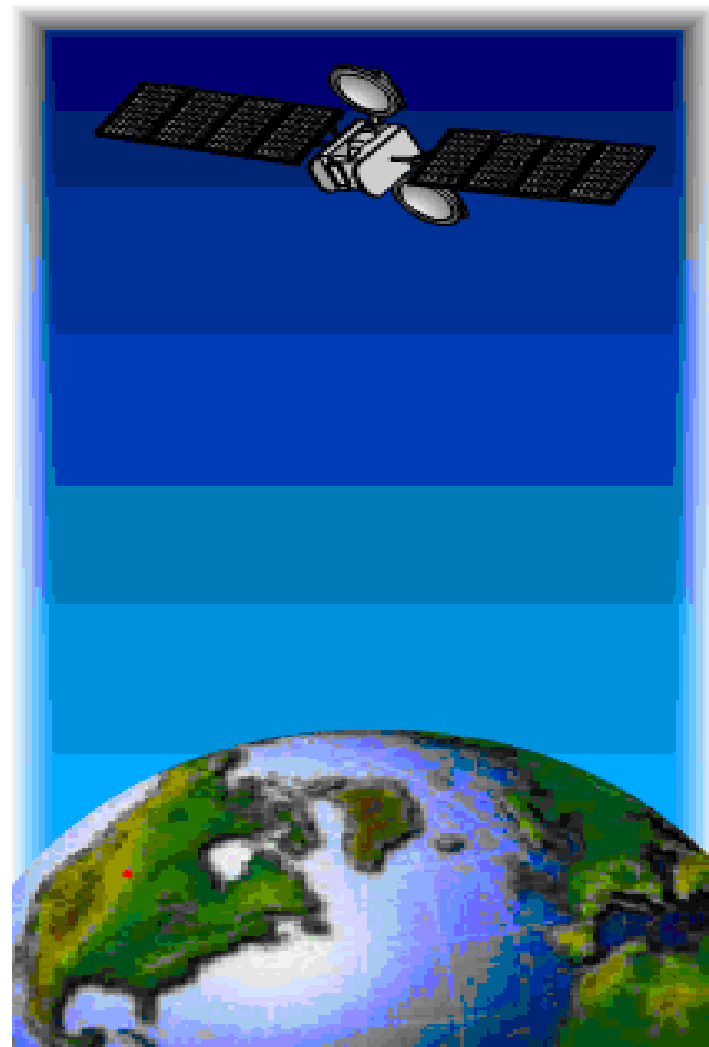
- Automatic Link Establishment (ALE) is a technique that permits HF radios to automatically call other stations and link on the best HF frequency.
- ALE systems use Link Quality Analysis (or "LQA Scores") stored in memory.

Channel	Frequency	Scores for R2	Scores for R3	Scores for R4
1	2.5 MHz			
2	4.0 MHz			
3	5.5 Mhz			
4	7.0 MHz			
				



TACSAT

- TACSAT Radios are also used by LRS for BLOS communications
- Can be use for both voice and data
- Advantages over HF:
 - Speed
 - Easy to operate
 - Faster data transfer speeds
- Satellites have become overcrowded



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DAMA



- Demand Assigned Multiple Access (DAMA)
- DAMA Allows many more users to access a satellite at once
- Also knows a “narrow-band” channel
- Each user must have an address that is in the GCS database
- No more “bootlegging” of satellites
- GCS has complete control of resources

AN/PSC-5D with
MX F-270 PRCD





SATCOM Radios

**Two DAMA capable
SATCOM Radio
Systems in use today
by LRS Units are:**

-An/PRC-117

-An/PSC-5 Spitfire



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AN/PRC-117





AN/PRC-117

- **Multi-band/multi-mission radio system**
- **Provides continuous coverage over the full 30-512 MHz band**
- **State-of-the-art modem technology (High Performance Waveforms)**
- **Interoperable with a wide variety of existing military and civilian communication systems**





Advantages of AN/PRC-117

- Designed to provide the most advanced tactical communications technology available in one single package.
- Microprocessor-based
- Software-controlled (vs hardware)
- Radio can be tailored to fit any unconventional, conventional or data/automation mission requirement
- More user-friendly and cost-effective when compared to current "standard" equipment



Advantages of AN/PRC-117

- Can be used as a bridge between two different communications systems (SINCGARS to SATCOM, SABRE to SINCGARS)
- Easy interface with standard laptops or Toughbooks through Data Port
- Uses Wireless Messaging Terminal (Outlook E-mail)
- Can be used as a Gateway to WWW (Standard E-mail to WMT)
- Retransmit capabilities (example UHF AM to VHF FM)



AN/PRC-117F



- **Manpack, vehicular, marine and base-station configurations**
- **Built-in ECCM and COMSEC capability**
- **Voice/data retransmission across traditional frequency bands and waveforms**
- **Data rates up to 64 kbs with built-in interfaces**
- **Full remote-control capability (all functions)**
- **Longer battery life due to low voltage logic design**
- **Multiband scanning**
- **100-channel presets for fixed frequency**



AN/PRC-117F



- **Optional Global Positioning System interface for navigation and time signals**
- **Software-reprogrammable to accommodate evolving waveforms, ECCM, COMSEC, signal processing and modulation techniques**
- **Dual antennas for optimal performance (30-512 mHz).**



Technical Data

- **Frequency Range: 30-512 MHz**
- **Net Presets: 100, fully programmable**
- **RF Impedance: 50 Ohms nominal**
- **Power Input: 26 VDC (20.5-32 VDC)**
- **Radio Weight: 9.8 lbs. without batteries**
- **High Speed Data: 48/64kbps (Option)**
- **Transmitter Output: FM: 1-10 Watts AM: 1-10 Watts**
- **Environmental: Per MIL-STD 810E**
- **Immersion: 3 ft. (.9m) of water**
- **Operating Temperature: -40°C to +70°C**



AN/PRC-117F

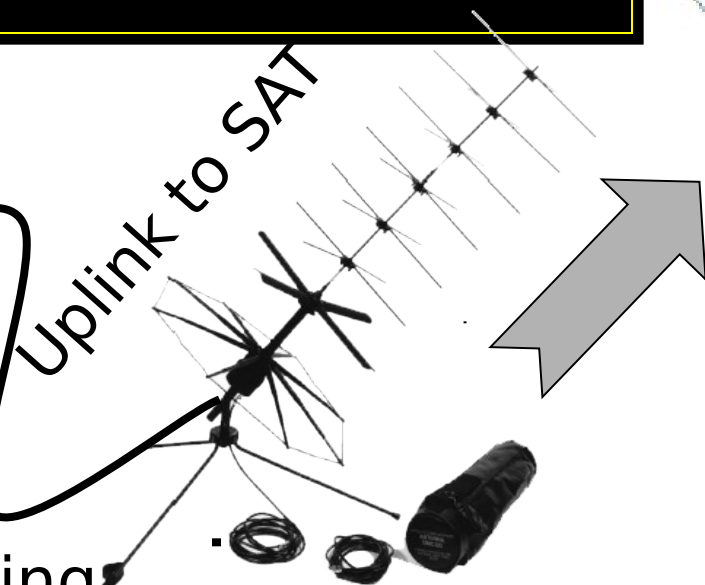
“Swiss Army Knife” Radio System



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Applications



Wireless Messaging
Terminal (E-mail)

Sent Via HPW

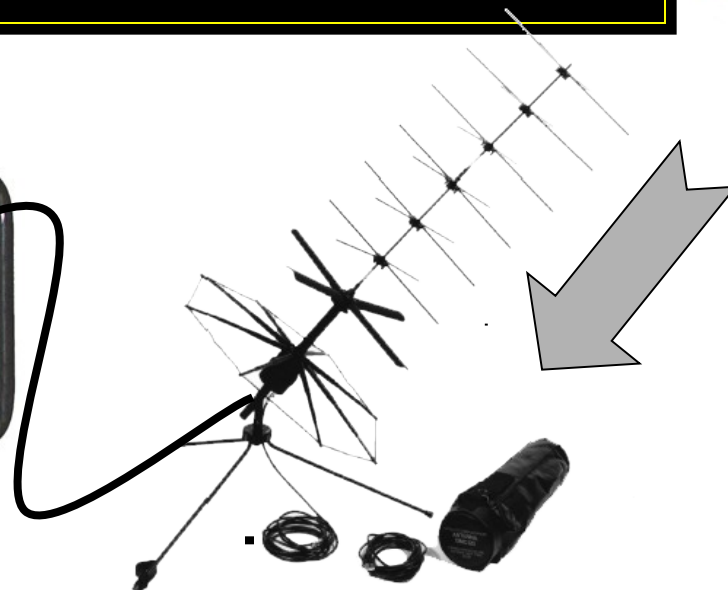


Image Sent to
Toughbook

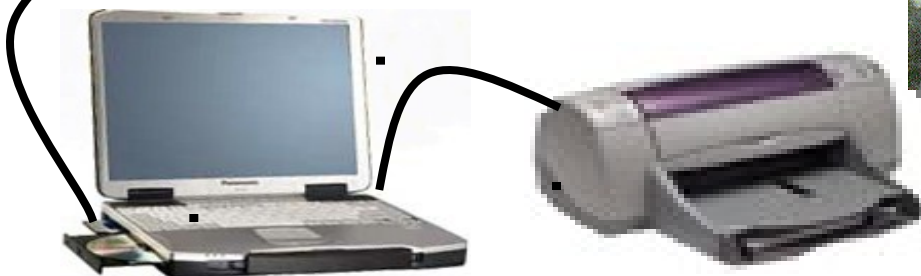
Reconnaissance and Surveillance Leader



Applications



Base Station

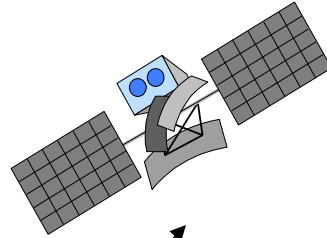




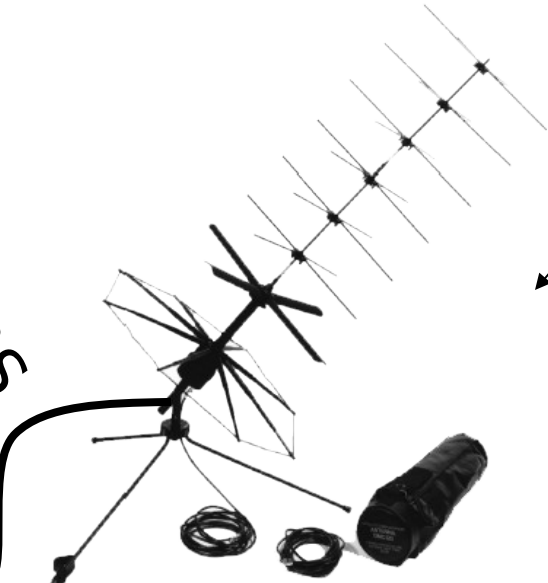
Retransmit



VHF FM SINCARS

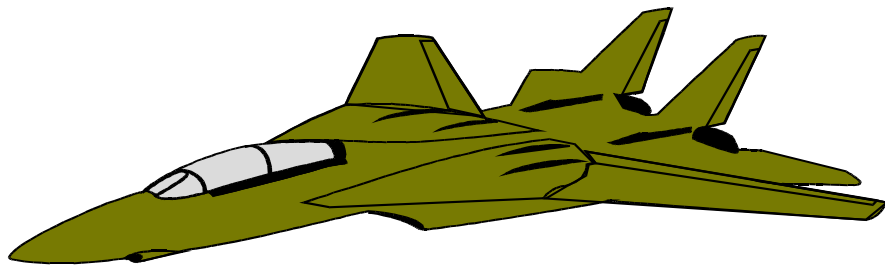


UHF SATCOM





Retransmit



VHF FM

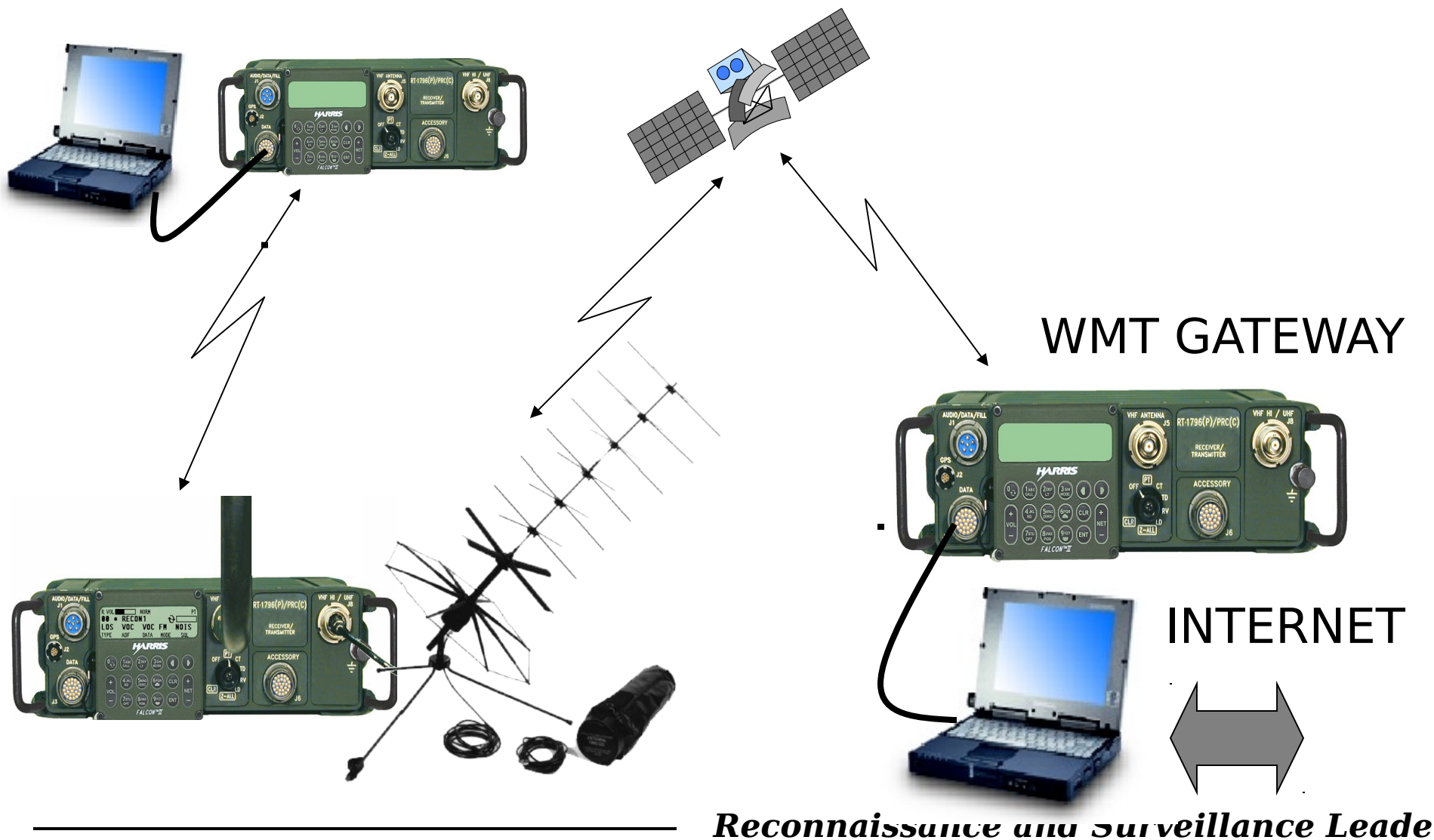
UHF AM



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Data Retransmit





AN/PSC-5 Spitfire



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AN/PSC-5 Spitfire



- Supports army special operations forces C2 in war and operations other than war
- UHF band from 225.0 megahertz (MHz) to 399.995 MHz
- Provides narrowband voice, 5-kilohertz (kHz) and 25-kHz (Wideband) operation
- 5-kHz DAMA and Demand Assigned Single Access (DASA) operation
- Half Duplex (HDX) SATCOM and line of sight (LOS) communications





AN/PSC-5 Spitfire

- Frequency Range 30-400 MHz
- Modes: UHF LOS and SATCOM ,including DAMA
- Size: 403 cubic inches
- Weight: 11 pounds
- Digital Voice: LPC-10e
- Applications: Manpack, Airborne, Vehicular, Fixed Station
- COMSEC: KY-57/58, KY-99/1 YV-5, KGV-11





AN/PRC-148 MBITR





AN/PRC-148 MBITR



- Multi-Band Intra-Team Radio (MBITR)
- Secure hand-held, lightweight radio
- Incorporates frequency-hopping technologies that are compatible with the SINCGARS radios systems
- Multi-purpose radio that can be used to communicate with other elements of a joint task force (including fixed and rotary winged aircraft), are ideally suited for LRS and reconnaissance operations.





AN/PRC-148 MBITR

- **30-512 MHZ CONTIGUOUS FREQUENCY COVERAGE**
- **AM/FM; VOICE/DATA**
- **SELECTABLE RF OUTPUT POWER**
- **US TYPE 1 COMSEC**
- **IMMERSIBILITY**
- **20 METER MARITIME VERSION**
- **2 METER URBAN VERSION**
- **LESS THAN 29 OUNCES, 34 CUBIC INCHES**
- **SINGARS SIP/HAVEQUICK II OPTIONAL**





Technical Data

Modulation Types:

AM and FM (Software)

Transmit Output Power:

0.1, 0.5, 1.0, 3.0 & 5.0 watts (FM)

1.0 & 5.0 watts (AM)

User Selectable

Emergency Beacons and GPS:

AM Swept Tone Beacon

GPS Interface to PLGR

Programmable Channels:

100 Memory Preset Channels

Menu Selectable Groups

User Programmable from:

Front Panel Menu

PC Programmer

Radio-to-Radio Cloning

Controls:

On/Off/Volume/Whisper/Zeroize Knob

16-Position Channel Select Knob

Large Tactile Push-To-Talk Switch

Squelch Override Push-button

Backlit 7 Button Keypad (NVG

Compatible)

2 Software Configurable Option Keys

Indicators:

**32 x 80 Pixel Backlit LCD (NVG
Compatible)**

Intuitive Menu Driven User Interface

Channel Name/Frequency

Group Name

Clear/Secure Mode

Key Location

Battery Capacity

Transmit Power



Technical Data

Connectors:

50 Ohm TNC Antenna
10 Pin Multi-function
Immersion Sealed Top Connector
(20M)
6-Pin Multi-function Top Connector
(2M)
18-Pin Side Connector for
Extended Capabilities and Upgrades

COMSEC:

US Type 1
VINSON & FED-STD-1023
Selective Key Zeroization
Panic Radio Zeroization with
Mechanical
Interlock Protection
Receive OTAR Compatible
6 Key Locations

Physical Parameters

(with battery):

Length: 8.44 inches (21.44 cm)
Width: 2.63 inches (6.68 cm)
Depth: 1.52 inches (3.86 cm)
Volume: 33.74 cu. inches (552.8
cubic cm)
Weight: 30.6 ounces (867.5 gm)

Environmental Specifications:

Temperature:

Operating: -31° to +60° C
Storage: -33° to +71° C
Humidity: 95% non-condensing
Shock: EIA-603-1992
Vibration: EIA-603-1992
Altitude: 30,000 Feet



Technical Data

Batteries:

Rechargeable Lithium-Ion

3000 mAH

>8 Hours Life at 5 Watts*

Non-Rechargeable Battery Holder

Commercial Lithium Cells

10 Hour Life at 5 Watts *

* Standard Duty Cycle (8:1:1)

Antenna Set:

30-90 MHz

30-512 MHz

Accessories:

Vehicle Adapter

Radio Holster

Radio System Carrying Bag

AC Powered Single Battery Charger

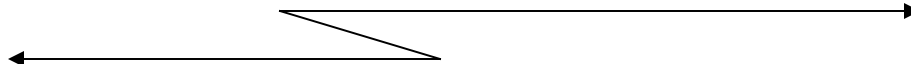
AC/DC Powered 6-way Battery Charger





Applications

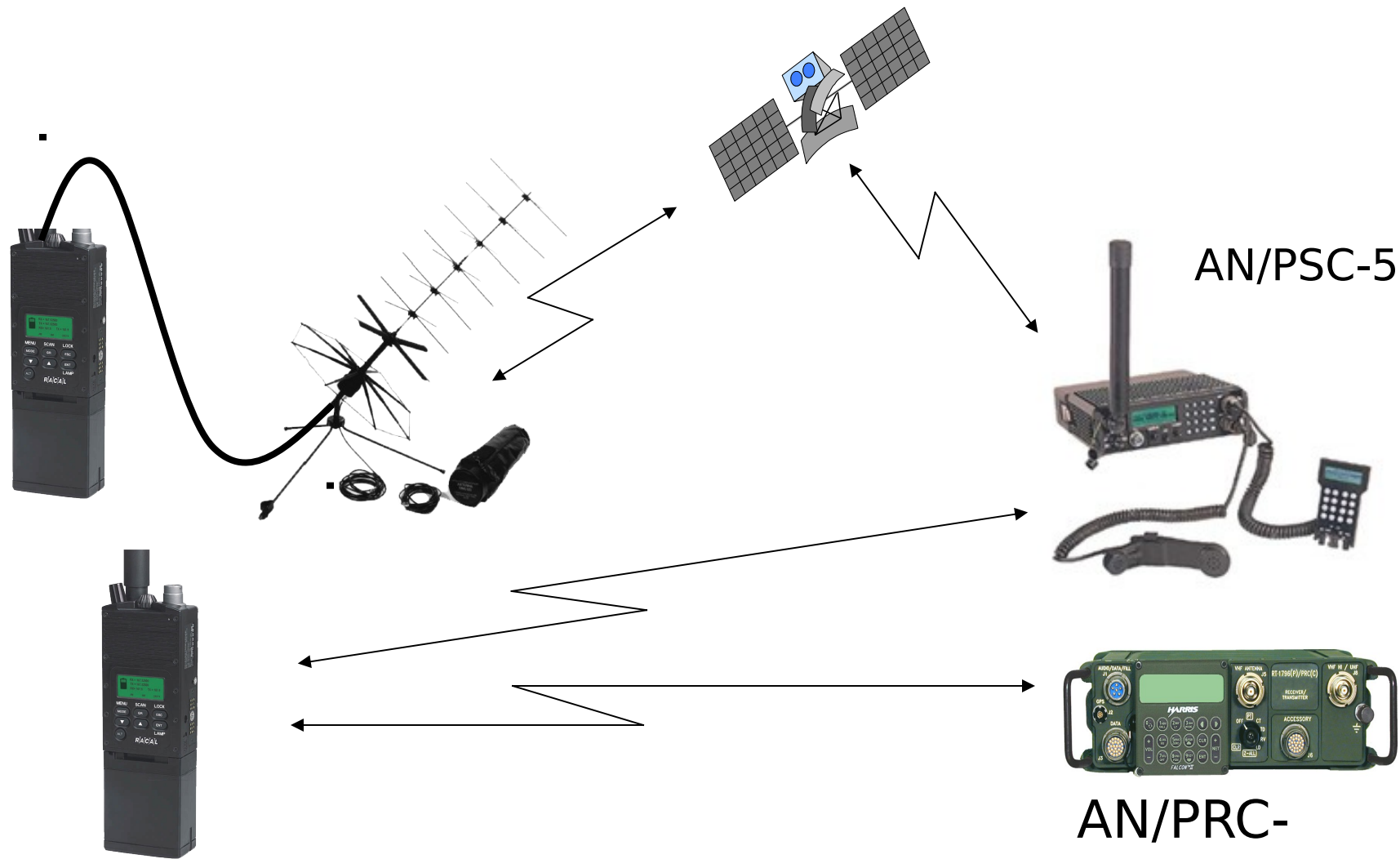
LOS- Surveillance to Hide
Inter-Team Communications



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Applications





Toughbook

- Ruggedized standard laptop computer
- Used as a data terminal device for the radio
- Used to send and receive reports and images
- Communicates to the radio through the serial port or synchronous data controller card (ViaSat)
- Can be powered by a BA-5590 or BB-390 with an adapter
- Can use “Tactical Chat” application for real time free text communications (no ViaSat card required)
- Wireless Messaging Terminal (HPW) uses “Outlook “ e-mail to communicate over SAT/HF (VDC-200 or VDC-400)
- Interfaces with any standard digital camera





Toughbook

- Full magnesium alloy case
- Moisture- and dust resistant LCD, keyboard and touchpad
- Sealed port and connector covers
- HDD is mounted in shock-absorbing gel
- Ruggedized port replicator connector
- Rugged and dust-resistant LCD hinges
- Ultra Low Voltage Mobile Pentium Processor
- Touchscreen Display 8.4" 800 x 600 (SVGA)





Toughbook Models

- **Fast CPU**
- **Large HD**
- **Touchscreen**
- **Expensive**
- **Laptop Size**
- **Base Station Use**



CF-72



Toughbook Models

- Smallest Model
- Touchscreen
- Fast CPU
- Large HD
- Team Use

CFM-34





Toughbook Models

- Older Model
- Slower CPU
- Smaller HD
- Less RAM
- Still in use
- Cannot be new



CF-27



Limitations/Constraints

High Frequency Radio Limitations and Constraints

- Planning Considerations
 - Planning Ranges
 - Operations in Unusual Conditions
- ALE Network Profiles (RPA) Development
- Frequency Management
- Training (operators/communications personnel)
- Enforcing HF ALE as primary means of communications

———~~Equipment (MTO&E vs. the right equipment)~~ *Recommendance equipment* *Recommendance Leader*



Limitations/Constraints

TACSAT Radio Limitations and Constraints

- Planning Considerations
 - DAMA Terminal Address Assignment
 - DAMA Order-wire Key
- Getting through on a DAMA channel
- Training (operators/communications personnel)
- Equipment (MTO&E vs. the right equipment)
- Relying on SATCOM and loosing HF skills